Marshall Star, August 1, 2012 Edition

MARSHALL STAR

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Marshall Center Says Farewell to Acting Director Gene Goldman

Marshall Space Flight Center team members gathered July 27 to bid farewell to Acting Director Gene Goldman. Goldman is retiring from the agency to accept a management position at Aerojet in Huntsville, effective Aug. 3. His departure ends a 22-year career with NASA that began in 1990 as a project engineer in the Marshall Space Shuttle Project Integration Office. Goldman has been acting center director at Marshall since March 5 when Robert Lightfoot began his assignment as NASA acting associate administrator at NASA Headquarters. Prior to that appointment, Goldman served as the center's deputy director beginning in March 2010.
(NASA/MSFC/Emmett Given)

Marshall Associate Director Robin Henderson, left, presents Goldman with space shuttle memorabilia during his farewell reception. Henderson will serve as acting center director following Goldman's departure. Prior to his most recent posts at Marshall, Goldman served as the director of the Stennis Space Center from 2008 until 2010, and deputy director at Stennis from 2006 to 2008. (NASA/MSFC/Emmett Given)

Rick Burt, chief safety officer in the Safety & Mission Assurance Directorate, right, wishes Goldman good luck as he begins a new chapter. Goldman describes his time at NASA as the finest in his professional career. "Working for NASA and supporting the Space Shuttle Program was a dream come true for me," said Goldman. "It has been an honor and a privilege to work on NASA's human spaceflight programs, both at Marshall and across the agency for more than two decades." (NASA/MSFC/Emmett Given)

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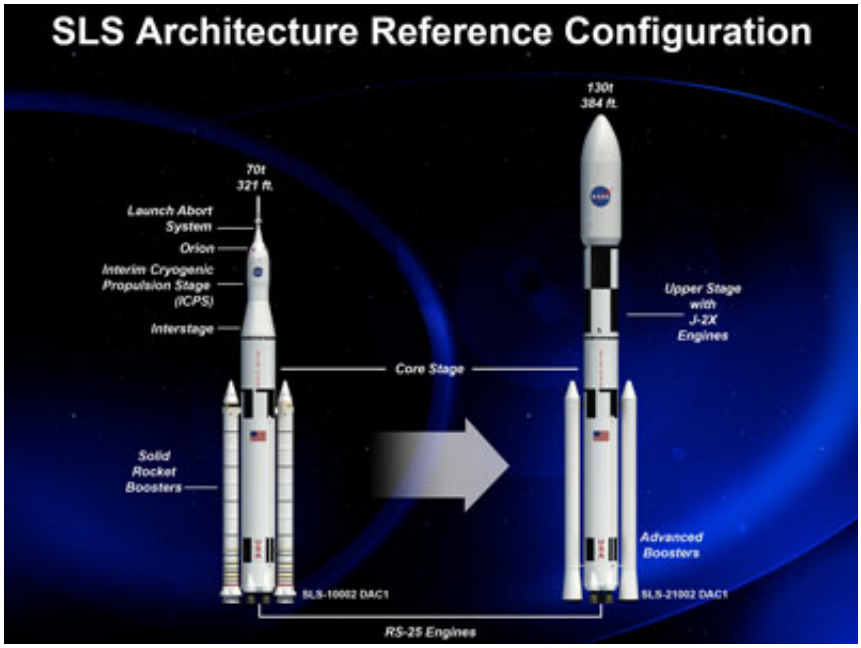
NASA's Space Launch System Passes Major Agency Review, Moves to Preliminary Design

From NASA news release



The rocket that will launch humans farther into space than ever before passed a major NASA review July 25. The Space Launch System Program completed a combined System Requirements Review and System Definition Review, which set requirements of the overall launch vehicle system. SLS now moves ahead to its preliminary design phase.

Image left: An artist rendering of the various configurations of NASA's Space Launch System managed by the Marshall Space Flight Center. (NASA/MSFC)

The SLS -- managed at the Marshall Space Flight Center -- will launch NASA's Orion spacecraft and other payloads, and provide an entirely new capability for human exploration beyond low-Earth orbit.

These NASA reviews set technical, performance, cost and schedule requirements to provide on-time development of the heavy-lift rocket. As part of the process, an independent review board comprised of technical experts from across NASA evaluated SLS Program documents describing vehicle specifications, budget and schedule. The board confirmed SLS is ready to move from concept development to preliminary design.

"This new heavy-lift launch vehicle will make it possible for explorers to reach beyond our current limits, to nearby asteroids, Mars and its moons, and to destinations even farther across our solar system," said William Gerstenmaier, associate administrator for the Human Exploration and Operations Mission Directorate at NASA Headquarters. "The in-depth assessment confirmed the basic vehicle concepts of the SLS, allowing the team to move forward and start more detailed engineering design."

The reviews also confirmed the SLS system architecture and integration with the Orion spacecraft, managed by the Johnson Space Center, and the Ground Systems Development and Operations Program, which manages the operations and launch facilities at the Kennedy Space Center.

"This is a pivotal moment for this program and for NASA," said SLS Program Manager Todd May. "This has been a whirlwind experience from a design standpoint. Reaching this key development point in such a short period of time, while following the strict protocol and design standards set by NASA for human spaceflight is a testament to the team's commitment to delivering the nation's next heavy-lift launch vehicle."

SLS reached this major milestone less than 10 months after the program's inception. The combination of the two assessments represents a fundamentally different way of conducting NASA program reviews. The SLS team is streamlining processes to provide the nation with a safe, affordable and sustainable heavy-lift launch vehicle capability. The next major program milestone is preliminary design review, targeted for next year.

For more information about the Space Launch System, including the newest proposed rocket configurations, visit http://www.nasa.gov/sls.

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Building the Future: Advanced Development Office at Marshall Pioneering Technology for Space Launch System

By Bill Hubscher

The Marshall Space Flight Center has always been considered a leader when it comes to innovation. From weather observation, to chemical laboratories and experiments with various materials -- Marshall Center scientists and engineers use the facilities here to improve life on Earth.

As part of the Space Launch System Program managed at the Marshall Center, the Advanced Development Office funds and guides nearly two-dozen projects benefiting the development of the many elements of the heavy-lift rocket that will carry astronauts beyond low-Earth orbit.

"The SLS program is moving forward with engineering designs for the 70-metric-ton configuration that will launch the Orion spacecraft using updated technology we already have," said Chris Crumbly, manager of the Advanced Development Office in SLS. "As we develop the evolved 130-metric-ton heavy-lift version of the SLS, these advanced development projects will improve the reliability and affordability of the entire program."

An example of a project funded by the Advanced Development Office is Selective Laser Melting, or SLM. This project takes metal powder and uses a high-energy laser to melt the powder. The SLM process provides the capability to produce parts with highly complex geometries and excellent mechanical properties directly from three-dimensional CAD data. SLM can significantly reduce the manufacturing time required to produce parts from months to hours, thus significantly improving affordability.

"We develop and improve emerging technologies and manufacturing techniques, pass them on to the various SLS element offices and then to the industry," said Fred Bickley, assistant manager of the Advanced Development Office. "We are maturing cutting-edge technology with risk reduction in mind -- looking for designs meeting our requirements while increasing the safety for our astronauts and workforce and reducing budgetary and scheduling issues."

While work on many of the projects under the Advanced Development Office has already begun, one of the largest efforts was announced recently when NASA selected six research and engineering demonstration proposals to investigate an advanced booster system for the 130-metric-ton configuration of the Space Launch System. Negotiations are currently ongoing with the proposers with an expected contract award by October 2012.

"We are open to the many options in building a new booster using either liquid or solid propellant," said Crumbly. "That's the whole point to this office -- to explore new designs and ideas to build better and safer rockets. We're excited about the possibilities and look forward to collaborating with our industry partners on new advancements."

Hubscher, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

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Going for the Gold: A Summer of Records for J-2X Engine Testing

As Olympic athletes converge on London with dreams of winning gold in the 2012 Summer Olympic Games, NASA is also setting records testing the J-2X powerpack at the Stennis Space Center. The first time was June 8, when engineers went the distance and set the Test Complex A record for long duration testing with a 1,150-second firing of the developmental powerpack assembly -- a system of components on the top portion of the J-2X engine. This broke the previous record set in 1989 when the complex conducted a 1,075-second test firing of a space shuttle main engine. On July 24, engineers surpassed both marks with a 1,350-second test of the engine component on the A-1 Test Stand at Stennis.

The J-2X engine will power the upper-stage of a planned two-stage Space Launch System, or SLS. The SLS will launch NASA's Orion spacecraft and other payloads, and provide an entirely new capability for human exploration beyond low-Earth orbit. Designed to be safe, affordable and flexible for crew and cargo missions, the SLS will continue America's journey of discovery and exploration to destinations including nearby asteroids, Lagrange points, the moon and ultimately, Mars.

The J-2X is being built by Pratt & Whitney Rocketdyne for the Marshall Space Flight Center. On the complete J-2X engine, the powerpack feeds the thrust chamber, which produces the engine fire and thrust. The advantage of testing the powerpack without the thrust chamber is to operate the powerpack over a wide range of conditions to understand safe duration and thrust limits.

The July 24 test specifically gathered data on performance of the liquid oxygen and fuel pumps during extreme conditions. The test data provides critical information for continued development of the turbopump for use on the J-2X engine, the first human-rated liquid oxygen and liquid hydrogen rocket engine to be developed in four decades. (NASA/SSC)

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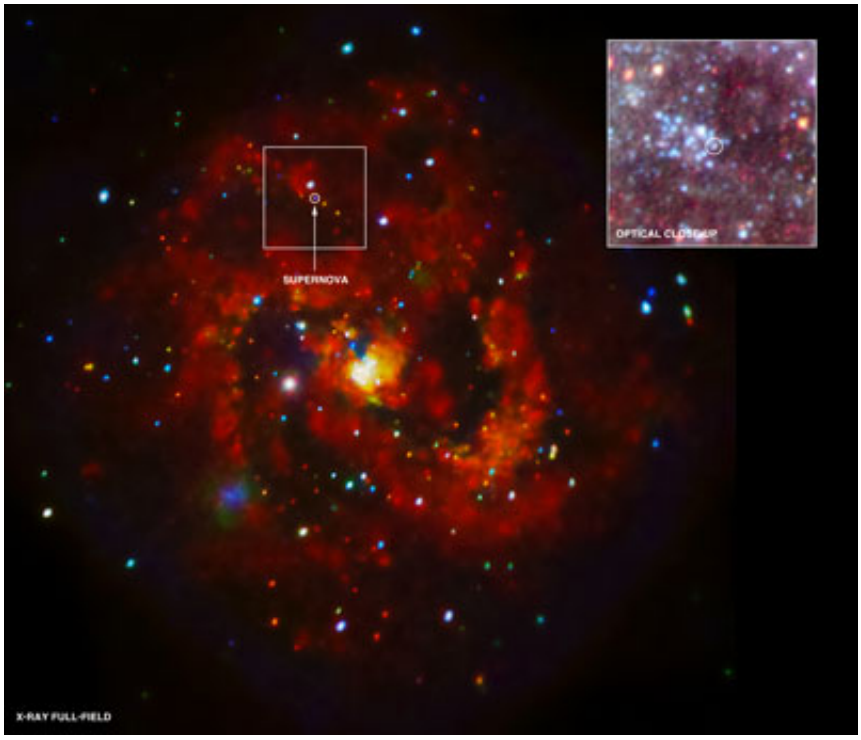
X-rays Discovered From Young Supernova Remnant



More than 50 years ago, a supernova was discovered in M83, a spiral galaxy about 15 million light-years from Earth. Astronomers have used NASA's Chandra X-ray Observatory to make the first detection of X-rays emitted by the debris from this explosion.

Named SN 1957D because it was the fourth supernova to be discovered in the year 1957, it is one of only a few located outside the Milky Way galaxy that is detectable, in both radio and optical wavelengths, decades after its explosion was observed. In 1981, astronomers saw the remnant of the exploded star in radio waves, and in 1987 they detected the remnant at optical wavelengths, years after the light from the explosion itself became undetectable.

A relatively short observation -- about 14 hours long -- from NASA's Chandra X-ray Observatory in 2000 and 2001 did not detect any X-rays from the remnant of SN 1957D. However, a much longer observation obtained in 2010 and 2011, totaling nearly 8.5 days of Chandra time, did reveal the presence of X-ray emission. The X-ray brightness in 2000 and 2001 was about the same as or lower than in this deep image.

This new Chandra image of M83 is one of the deepest X-ray observations ever made of a spiral galaxy beyond our own. This full-field view of the spiral galaxy shows the low, medium, and high-energy X-rays observed by Chandra in red, green and blue respectively. The location of SN 1957D, which is found on the inner edge of the spiral arm just above the galaxy's center, is outlined in the box.

The new X-ray data from the remnant of SN 1957D provide important information about the nature of this explosion that astronomers think happened when a massive star ran out of fuel and collapsed. The distribution of X-rays with energy suggests that SN 1957D contains a neutron star, a rapidly spinning, dense star formed when the core of pre-supernova star collapsed. This neutron star, or pulsar, may be producing a cocoon of charged particles moving at close to the speed of light known as a pulsar wind nebula.

If this interpretation is confirmed, the pulsar in SN 1957D is observed at an age of 55 years, one of the youngest pulsars ever seen. The remnant of SN 1979C in the galaxy M100 contains another candidate for the youngest pulsar, but astronomers are still unsure whether there is a black hole or a pulsar at the center of SN 1979C.

An image from the Hubble Space Telescope (in the box labeled "Optical Close-Up") shows that the debris of the explosion that created SN 1957D is located at the edge of a star cluster less than 10 million years old. Many of these stars are estimated to have masses about 17 times that of the sun. This is just the right mass for a star's evolution to result in a core-collapse supernova as is thought to be the case in SN 1957D.

These results will appear in an upcoming issue of The Astrophysical Journal. The researchers involved with this study were Knox Long and Bradley Whitmore, both of the Space Telescope Science Institute; William Blair and Kip Kuntz, both of Johns Hopkins University; Leith Godfrey and Roberto Soria, both of Curtin University, Australia; Paul Plucinsky of the Harvard-Smithsonian Center for Astrophysics; Christopher Stockdale of the University of Oklahoma and the Australian Astronomical Observatory; and Frank Winkler of Middlebury College.

The Marshall Space Flight Center manages the Chandra program for NASA's Science Mission Directorate in Washington. The Smithsonian Astrophysical Observatory controls Chandra's science and flight operations from Cambridge, Mass.

Credits: X-ray: NASA/CXC/STScI/K.Long et al., Optical: NASA/STScI

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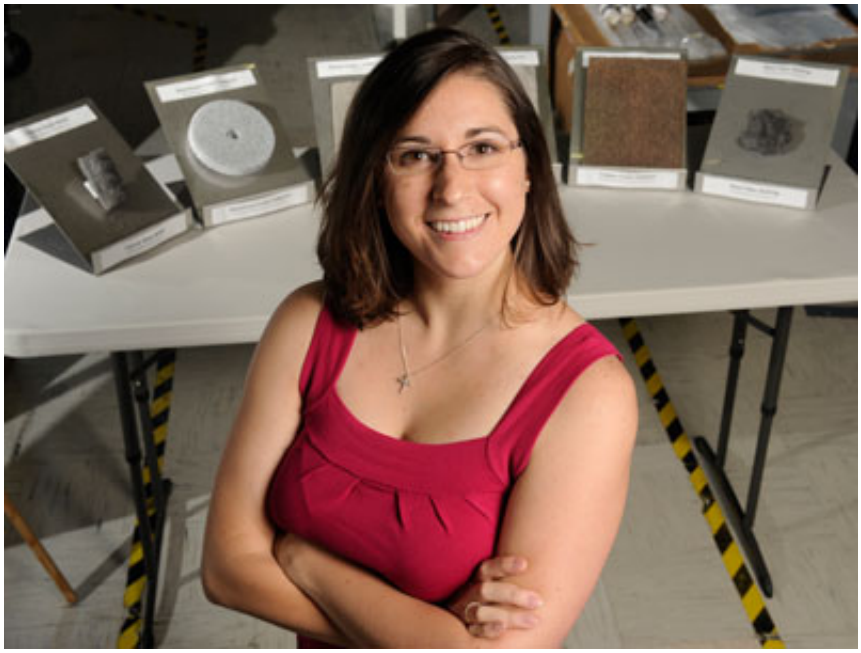
Marshall Researcher Dr. Morgan B. Abney Honored With Presidential Early Career Award
By Rick Smith



Dr. Morgan B. Abney, a space systems engineer at the Marshall Space Flight Center, is among six NASA researchers named July 23 by President Barack Obama as recipients of the 2011 Presidential Early Career Award for Scientists and Engineers, or PECASE.

Image right: Dr. Morgan B. Abney (NASA/MSFC)

Abney was recognized for her innovative technical leadership in advancing technologies for recovering oxygen from carbon dioxide for self-sustaining human space exploration. As part of the Space Systems Development, Integration & Test Division team within Marshall's Engineering Directorate, she seeks to develop advanced atmosphere-revitalization technologies for future crewed flight missions.

The PECASE award is the highest honor bestowed by the U.S. government on scientists and engineers beginning their independent careers. The award recognizes recipients' exceptional potential for leadership at the frontiers of scientific knowledge, and their commitment to community service as demonstrated through scientific leadership, education or community outreach.

"Discoveries in science and technology not only strengthen our economy, they inspire us as a people," President Obama said. "The impressive accomplishments of today's awardees so early in their careers promise even greater advances in the years ahead."

Ninety-six researchers, representing 11 federal agencies, were honored this year. All will receive their awards at a ceremony later this month in Washington.

"Dr. Abney brings a highly analytical mind and strong interpersonal skills to the challenges of long-duration human exploration missions," said Chris Singer, director of Marshall's Engineering Directorate. "Her zeal for her work, and her ability to communicate complex technical issues to all our diverse stakeholders, exemplify the best that NASA offers. She is a credit to the agency and to the nation we serve."

"Helping sustain human life in space is the most rewarding job I can imagine," Abney said. "I'm proud to participate in the development of revolutionary life-support systems for the next era in space exploration."

A native of Berea, Ky., Abney graduated from Vanderbilt University in Nashville in 2003 with a bachelor's degree in chemical

engineering. She received her doctorate in chemical engineering in 2007 from the University of Kentucky in Lexington, and spent a year as a development engineer for Lexmark International of Lexington. She joined the Marshall Center in 2008 as the lead design engineer for the development of new loop-closure technologies -- seeking ways to increase the amount of oxygen recycled during long-duration space missions, reducing the amount of stored air needed to be carried from Earth.

Today, she is the technical lead for NASA's Life Support System Oxygen Recovery Technology Development effort, identifying new hardware and reclamation solutions to support human spaceflight.

Abney is the author or co-author of nearly a dozen published research papers. In 2010, she received the Marshall Center's Technology Transfer Award for her role in the advancement of a developmental trace contaminant control technology. She also is a 2011 recipient of a Silver Telly Award as a technical advisor for the Marshall-produced DVD, "What it Takes to Live Away From the Earth." The Telly Awards annually recognize the visual arts industry's finest film and video productions and best local, regional and cable TV and Web programming.

For more information about environmental control and life support system work at the Marshall Center, visit http://www.nasa.gov/centers/marshall/earthorbit/hardware.html.

More About the PECASE Award
The PECASE award was commissioned in 1996 by President Bill Clinton, who asked the National Science and Technology Council to create an award program to honor the work of young American professionals conducting scientific or technological research. The awards are presented annually to scholars and researchers supporting work across the breadth of the federal government. For a complete list of 2011 award winners, visit http://www.whitehouse.gov/the-press-office/2012/07/23/president-obama-honors-outstanding-early-career-scientists.

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Microgravity Science Glovebox Marks Anniversary with 'Hands' on the Future

Marking the 10th anniversary of an achievement is a proud occasion. And when it's marked in space, some believe it's even more of an achievement. That's not lost on the hundreds of researchers, astronauts and operational engineers who have had their "hands" in the Microgravity Science Glovebox on the International Space Station.

Image left: Expedition 30 Commander Dan Burbank works with hardware inside the Microgravity Science Glovebox aboard the International Space Station. (NASA)

The glovebox, also known as MSG, is sealed and at negative pressure, so astronauts can manipulate experiment hardware and samples without the risk of small parts, particulates, fluids or gasses escaping into the open. It offers a 9-cubic-foot work area accessible to the space station crew through glove ports, and to ground-based scientists through real-time data links and video.

Located in the U.S. laboratory, this facility allows crew members to participate in the assembly and operation of investigations in space similar to laboratories here on Earth. The glovebox performed its first operations activity during Expedition 5 on July 1, 2002.

"Starting with Peggy Whitson on Expedition 5 and running through our current crew, MSG has been extremely fortunate to have people of tremendous drive and passion perform our science experiments," said Lee Jordan, project manager for the Microgravity Science Glovebox at the Marshall Space Flight Center. "The glovebox's 10-year road has been lined with scientific milestones and accomplishments that have added to human knowledge and emphasized the continued need for space science and exploration."

In the more than 12,000 hours it has been used aboard the station, the glovebox has handled its share of research. Twenty-four different experiments ranging from materials science to fluid physics to combustion and more have been performed.

Among the 24 investigations, here are some highlights:

CSLM-2 -- Coarsening in Solid Liquid Mixtures-2 is a materials science experiment designed to study the rate at which particles of tin suspended in a liquid comprised of molten tin/lead alloy increase in size -- a process called coarsening. During this process, small particles shrink by losing atoms to larger particles, causing the larger particles to grow, or coarsen, within a liquid lead/tin matrix. CSLM-2 takes advantage of the microgravity environment on the space station, in which there is no sedimentation or convection to influence coarsening. This study defines the mechanisms and rates of coarsening that govern similar processes that occur in materials made on Earth, such as turbine blades, dental amalgam fillings, aluminum alloys, etc. On Earth, these materials contain pores created and trapped during solidification, and these pores cause a distinct weakening in the overall structure of the cast product. Investigations such as CSLM-2 may lead to the development of improved manufacturing processes for commercially important materials.

BASS -- Burning and Suppression of Solids examines the burning and extinction characteristics of a wide variety of fuel samples in microgravity. The BASS experiment will guide strategies for extinguishing accidental fires in microgravity. BASS results contribute to the combustion computational models used in the design of fire detection and suppression systems in microgravity and on Earth.

InSPACE -- Investigating the Structure of Paramagnetic Aggregates from Colloidal Emulsions is a microgravity fluid physics experiment to obtain fundamental data of the complex properties of an exciting class of smart materials called magnetorheological, or MR, fluids. MR fluids are suspensions of very small (micron-sized) magnetic particles in a nonmagnetic medium. These controllable fluids can quickly transition into a nearly solid-like state when exposed to a magnetic field and return to their original liquid state when the magnetic field is removed. The microgravity environment that is provided on the space station eliminates the effects of sedimentation on the particles and thus the integrity of the fluid. By understanding the complex properties of these fluids and learning the way the particles interact, scientists can develop more sophisticated methods for controlling these fluids and using them in a variety of devices such as new brake systems, seat suspensions, robotics, clutches, airplane landing gear and vibration damping systems.

Image right: Thinner gloves that provide more dexterity and sense of touch are part of new upgrades to the Microgravity Science Glovebox. (NASA)

The glovebox's provisions have made it accommodating to both crew-intensive science operations and autonomous, ground-operated investigations, keeping it an active participant on the station's dynamic, payload timeline. As the glovebox team celebrates

10 years of operations, it looks to a future that promises new and exciting research. Although it was originally slated to come home in 2012, the glovebox now looks to 2020 and beyond to support science on the station.

While the glovebox has predominantly supported materials science-type payloads, the addition of biological/life science payloads to the list of investigations has created a stir of change and excitement for the future. The Microgravity Science Glovebox project at the Marshall Center is developing Life Science Ancillary Hardware, or LSAH, and a new video drawer to accommodate the addition of life science payloads to the glovebox manifest.

The updated hardware will feature new filters, gloves and a UV decontamination system to support life science investigations within the glovebox environment. The new video system will feature high-definition cameras and monitors, high-frame-rate cameras, and digital video storage. Both sets of hardware should be ready for flight in the fall of 2013.

The glovebox was developed by the European Space Agency and is managed by the Marshall Center.

"The efficiency of the Microgravity Science Glovebox has been an invaluable asset to research on the station," said Martin Zell, responsible for space station utilization for the European Space Agency. "Our cooperation with NASA on this project has worked seamlessly over the past 10 years to facilitate hundreds of experiment runs, leading to excellent scientific results that are of importance here on Earth."

Meggs, an AI Signal Research Inc. employee, supports the Office of Strategic Analysis & Communications.

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International Space Station Astronaut Ron Garan to Visit Marshall Center on Aug. 7
By Lori Meggs

Expedition 27/28 astronaut Ron Garan, who lived and worked nearly six months aboard the International Space Station, will visit the Marshall Space Flight Center on Aug. 7. Garan will share highlights from his 164-day mission in space from April 4 through Sept. 15, 2011. Garan's mission included the last visit from a space shuttle to the station.

Image left: Astronaut Ron Garan works with the International Space Station Agricultural Camera (ISSAC) in the Destiny laboratory of the International Space Station. The camera is used to take frequent images principally of vegetated areas such as growing crops, grasslands and forests. (NASA)

While aboard the station, Garan worked on a variety of microgravity experiments and received provisions from two shuttle missions to ensure the orbiting outpost had enough supplies and spare parts until new commercial resupply spacecraft were ready to join a suite of international cargo delivery vehicles. Garan also participated in the last space-shuttle-based spacewalk during the STS-135 mission in July 2011.

Garan will present mission highlights from 1-2 p.m. in Morris Auditorium. An autograph session will follow.

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A Letter to My Daughter: At Marshall LGBT Awareness Activity, Daniel Crosby Tells How He Hopes His Daughter Will Grow Up in an Accepting World

Dr. Daniel Crosby, president of IncBlot Organizational Psychology in Huntsville, speaks at a recent awareness activity hosted by the Marshall Space Flight Center's Lesbian, Gay, Bisexual and Transgender, or LGBT, and Friends Professional Collaborative Group. Crosby, right, shared with team members a letter he composed to his 3-year-old daughter, Charlotte. He wrote that he hopes she'll grow up in a world without prejudice and where people won't label each other. He said, "It's my hope that as you read this letter the world is a better place than at the time of its writing. Not in a flying cars and robot maids sort of way, but as a result of greater introspection, humility and acceptance by the members of the human family." To read his letter, visit here. For more information about Marshall's LGBT & Friends Professional Collaborative Group, contact Lynn Motley, the center's employee assistance program coordinator, at lynn.m.motley@nasa.gov or at 544-7549. (NASA/MSFC/Emmett Given)

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http://www.nasa.gov/centers/marshall/about/star/index.html